

Dominion School Telegraphy and Railroading

Toronto, Ontario



**Practical Instructions and Special Lectures in
RAILROAD AND COMMERCIAL TELEGRAPHY
FREIGHT, TICKET, BAGGAGE AND
GENERAL STATION WORK**

Second Edition

Instruction Paper with Test Questions

Telegraphy

Part 2

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HOW TO STUDY.

1. The lessons are divided into parts and numbered, and are only supplied to the student as he progresses with his studies. Study a few pages at a time. Do not skip from one section of the paper to another. If there are any statements you do not understand, ask the instructor, or drop us a card or letter, advising what section and page you are having difficulty with, and we will explain the matter in detail. Review thoroughly, and write out the answers to the test questions at the end of this paper, and send or hand in your work for criticism. Your class letter and number is given you on your certificate of enrollment, and it is important that you put this on your examinations, as well as any letters you write to the schools. Failing to write this on, will cause delay in answering letters or returning examination work. Send one examination at a time. Don't write out the examination questions themselves. Use the number of the questions and write out your answer. In writing the answers, simply head your paper thus:—

Answers to Test Questions. Telegraphy Part 1.

John Smith, G.D. 215,

440 Delaware Ave.,

Nov. 30/10.

Toronto, Ont.

2. We desire to get in close touch with you in your studies, and would ask that you keep us informed regarding your progress and any difficulties you may meet with in your studies.

WRITING ON THE TELEGRAPH KEY.

1. The second step in the study of telegraphy, is the writing or making the characters on the telegraph instrument, known as the key. This may be done alone. It requires a great deal of practice before one is thoroughly familiar with the method of operating, but we trust the instruction in this book will serve to give you the practical information necessary to attain the art of good sending.

2. In writing on the telegraph key, it is important that you sit erect in an easy natural position, facing the key. Both feet should be on the floor, the right foot slightly in advance of the left. The left arm in the same position as if you were holding a page of paper to write on. In reality, this is the proper position for penmanship.

3. The student should bear in mind that accurate sending is of greater importance than speed. Take good care that you send slowly at first. Strive for a uniform, even, smooth style of sending. Speed will come by practice.

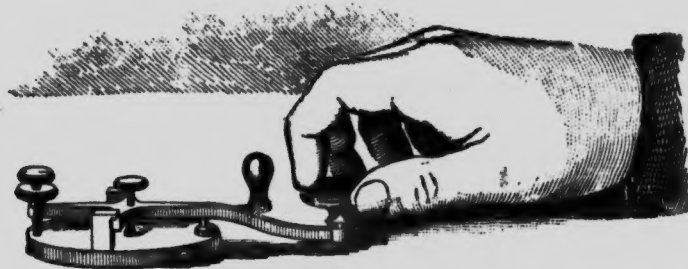


Fig. 1.
HOLDING THE KEY.

4. The proper position for holding the key is shown in fig. 1, and is the one adopted by the majority of the most speedy and perfect operators.

5. Rest the first finger on the top and near the edge of the key button, with the thumb and the second finger against the opposite edges, as shown. Curve the first and the second finger so as to form the quarter section of a circle. Avoid straightness or rigidity of these fingers and the thumb. Partly close

the third and the fourth finger. Rest the elbow easily upon the table, allowing the wrist to be perfectly limber. When the proper "swing" is acquired, the forearm moves freely in conjunction with the wrist and fingers. The fingers and thumb should act as the end of a lever, the wrist and forearm doing the work. Let the grasp on the key be moderately firm, but not rigid. Grasping the knob tightly will quickly tire the hand and destroy the control of the key, causing what is termed "telegraphers' cramp," or the "glass hand."

6. Another position may be mentioned, although we do not think it is as good a position as the one illustrated. Place the first two fingers on the farther edge of the key knob with the thumb under the edge. This position sometimes rests the hand from the first position mentioned. The balance of the information given for the position illustrated in fig. 1 will apply in this case as well.

7. Avoid too much force or too light a touch, and strive for a medium firm closing of the key. It is not the heavy pressure of the key but the evenness of the stroke that constitutes good sending. Telegraph repeaters can be adjusted for both light and heavy senders, but not for an uneven sender. A telegraph repeater adjusted for either a light or a heavy sender might be out of adjustment for a perfect sender. The motion should be directly up and down, avoiding all side pressure. Never, of course, allow the fingers or thumb to leave the key; that is, do not tap or strike the key with the fingers, or allow the elbow to leave the table. The correct method of sending is an easy one, and, when it is properly done, an operator should be able to send for 12 hours continuously without tiring.

ELEMENTARY INSTRUCTION.

8. Assuming that you have memorized the telegraph codes as given in the first instruction paper, we will discontinue the use of the symbols in this book, so that all the practice exercises taken up in order, will be helpful to the memory in recalling what stands for the characters, and in this way, advance the work more rapidly than would otherwise be the case if the symbols were shown underneath each letter, figure, etc.

HOW TO MAKE DOTS, DASHES AND SPACES.

9. You will remember in the first instruction paper, the dot was taken as the unit by which the lengths of the dots, dashes and spaces were measured, and a table was also given you, showing the difference in the time of making a dot, dash, etc., the dash being three times the length of the dot or 3 units. This dash has reference to the letter "T."

10. The dot "E" is made by a firm downward stroke of the key, followed immediately by a quick upward motion. On the sounder, the dot is indicated by a down stroke, and immediately followed by an up stroke.

11. The dash "T" is made by holding the key down as long as it takes to make 3 dots. On the sounder, the short dash is indicated by a down stroke, followed (after an interval of 3 dots) by an up stroke.

12. The long dash "L" is made by holding the key down, as long as it takes to make 6 dots.

13. The extra long dash "O, cypher," is made by holding the key down as long as it takes to make 9 dots. This will be noticed to be one-half longer than the long dash "L." However, in practice, the "L" and the "O" are generally made the same. Occurring alone, the long dash will be read as "L," but when found among figures, it will be translated as "O, cypher."

14. NOTE.—When the student has thoroughly mastered the art of sending and receiving, the length of the dash, long dash and extra long dash may be shortened as follows: Dash to 2 units, long dash to 4 units, extra long dash to 5 units. This will be done unconsciously in rapid sending. By thus shortening the dashes, a material gain and rapidity of transmission is affected without any great disadvantage.

15. The intervals between dots and dashes in the same letters are called breaks, and in letters that do not contain spaces, the dots and dashes should follow one another as closely as possible, but in the spaced letters, O, C, R, Y, Z, &, the space should occupy the time required for 2 units, that is, the space between the dots in the letter. Such a space is indicated on the sounder by an interval of the duration of 2 units between the instant of breaking and the making of the next character. The down and up motions occupy about 1 unit of time.

16. The interval between letters in a word, should occupy the time required for 3 dots or 3 units. The interval between words, should occupy the time required for 6 units, that is, the key remains against the upper contact for 5 units, the up and down motion occupying 1 unit of time.

HINTS IN SENDING.

17. In telegraphy, the same as in penmanship, it is important that a careful study of the position of the body and the movement of the wrist should not be slighted. The more attention given to the correct position and movement, the better and faster will be the gain in sending.

Uniform spacing, with a firm smooth style of sending should be attained by giving proper time in practice to the various exercises that are to follow.

All letters must be made perfect, and do not get into the habit of sending too fast at first, without any regard to uniform spacing. Some are inclined to put the characters in letters too closely together, which creates jerky uneven sending, which is not only hard to copy, but hard to read.

A very good rule for a beginner to observe in order to get good spacing between letters in words and between words in sentences, is to pronounce each letter after it is made, then the word after you have pronounced the last letter of each word. You will notice in this plan that in pronouncing the word after the letter you give about twice the space between the words that you do between the letters of the words, which is correct.

If an error is made in sending, the interrogation mark should be made, just in the same way as a person would say in carrying on a conversation and had made a mistake, "I beg your pardon," repeating the last word that was spoken, or, in the case of telegraphy, repeating the word in which occurred the mistake. A sending operator is always supposed to recognize his own mistakes and correct them, as the receiving operator has no other method of knowing what is actually to be copied other than what he hears on the sounder.

EXERCISES IN SENDING.

18. At this stage of the instruction, you arrive at a time when you now apply to practical work what you have studied in the preceding instruction, and it must be borne in mind that in sending, careful thought should at all times be given, remembering that the more practice you have on the key, the more it disciplines the ear to recognize the sounds of the various characters, so that no matter who might be making the characters, they could be recognized and copied down.

19. The receiving off the instruments is considered the most difficult part in learning telegraphy, therefore, we cannot impress upon you, too much, the importance of plenty of practice, in order to get the various signs thoroughly fixed in the mind. The exercises will be taken up in numerical order, and should be mastered in regular order, as each is designed to unlock the exercise that follows. Do not be afraid to repeat the various exercises over and over, until such time as you can make them without any mistakes, and do not leave one exercise until it is thoroughly mastered.

EXERCISE 1.

20. After referring to the illustration of the proper method of holding the key, learn the movement first on the dot characters, making each character at the average rate of 3 dots per second.

21. As you progress in your practice exercises your speed will gradually increase without any noticeable effort on your part and this gaining in speed slowly is desired—a student should not send but a trifle faster than he can receive.

DOT CHARACTERS.

E I S H P 6

22. In practicing these characters, make each letter in order, thus:—One dot, two dots, three dots, etc., going through the exercise forward and backwards, until you are sure you get the proper number of dots each time for each individual letter. After this has been accomplished, drill on each individual letter, until you get in the habit of making each letter, as it comes to your mind without the slightest hesitation. After this, write the exercise in the various combinations, so that if they should come in the same manner as they would in a word like "his," you would not hesitate to make them.

23. If after making a character about 20 times your hand becomes tired or stiff, let go the key, pick up a piece of paper, or book, relax the muscles by simply closing and opening the fist, and bending the wrist in a straight up and down motion, then in taking hold of the key again, be sure your fingers drop into the proper position at once.

24. As the dot characters appear more often than any other letters in the alphabet, this is a very important exercise, and constant practice should be devoted to these all through the course, in order that you will gradually gain in speed.

25. Be careful to make the spacing between the dots uniform, and not prolong the last dot into a dash. It is a very bad habit to make 6 dots when you only want 5, or vice-versa.

Instructors' check here:—

EXERCISE 2.

26. This exercise is similar to the first, in as much as it is composed of dots and spaces. In making these letters, the space should be made just double that ordinarily allowed between the elements of the letter. Avoid making the space too long, as there is more likelihood that it be made too long rather than too short. Hold the key down for the duration of one dot only; the down and up motion of the key is equivalent to another dot, so that the total space is equivalent to 2 units. It will be remembered that in the table given in the first instruction paper, that the space in spaced letters was equivalent to 2 units. The space in these characters, is simply a pause equivalent to 2 units. The more rapid they are sent, the shorter the space will be, yet it will be uniform. As there are more dot and spaced characters, found in ordinary words, it is very important that they be thoroughly mastered, because it is in these characters that the beauty and pride that most operators have in sending, is usually shown. Here are the characters:—

SPACED CHARACTERS.

O C R Y Z &

27. Repeat this exercise on the key, backwards and forwards and in various ways, so that any letter can be made at will, and do not leave the exercise until it is thoroughly mastered.

Instructors' check here:—

EXERCISE 3.

28. Learn the movement on dashes by making them at the rate of one a second. Special care should be taken to make the breaks between the dashes as short as possible. If a good free movement is used, the dashes cannot be made too close together. In making letters composed of two or more dashes, the beginners have a tendency to make the final dash too short. Hold the key down the length of three dots for the ordinary dash. Here are the characters:—

DASH CHARACTERS.

T L M 5 0

29. Drill on this exercise until each one can be made in any order desired.

Instructors' check here:—

EXERCISE 4.

30. In this exercise, be careful not to hesitate in making a dash in each case. In making U it is similar to S, and should be made just as uniform as 3 dots, with the exception that you hold on to the last one and turn it into a dash. Beginners have a tendency to hesitate before coming to the dash, and apparently seem to put on extra stress in trying to make the dash uniform with the dots. Let the dots and the dashes follow one another closely, and avoid making the dash too short or too long.

DOT-AND-DASH CHARACTERS.

A U V 4

31. Practice on these backwards and forward and in various ways, until they can be made at will without any hesitation.

Instructors' check here:—

EXERCISE 5.

32. In making the Dash-and-Dot Characters, there is a great tendency to make the break between the dash and the dot too long, and should this be done in making the letter N, T E is made instead of N. In making the letter B, when you hold the key down to make the dash, the other three dots should be made uniform, and the letter should be made compact before the instrument is allowed to break. The dots following the dashes, should be made in a sense the same as if the whole character consisted of dots, with the exception that the pressure is held on the first part of the character, and the moment the instrument is released the dots should be made uniform.

DASH -AND-DOT CHARACTERS.

N D B 8

33. Practice these slowly at first, and strive for a firm, uniform motion on the key. In making the letter N, the dash-dot might be timed by pronouncing the word "Nine-ty," holding the dash while the first syllable is pronounced, and the dot when pronouncing the last. Drill on each letter individually, going backward and forward in the exercise as well as in various orders, until you have thoroughly mastered the movement of each one.

Instructors' check here:—

EXERCISE 6.

34. In this exercise, it will be noticed that if the last dot in I, S, H, or P is carelessly prolonged into a dash, the letter following it in the exercise will be made instead of the one intended. Notice A is the opposite of N, U the opposite of D, V the opposite of B, and 4 the opposite of 8. If A and N are made too closely together, you make the figure 1; similarly, too little space between T and H will produce figure 8.

DOT-AND-DASH CHARACTERS IN COMBINATION.

I A N S U D H V B P 4 8

35. Practice this exercise backwards and forwards and in various combinations, until each one can be mastered without any hesitation.

Instructors' check here:—

EXERCISE 7.

36. Two of the most difficult characters to make correctly are K and J. If the final dash in K is made too short, it will be D, and if too much space is made between the dot and last dash it will form N T. Similarly, too much space before the second dash in J will transform it into N N. Keep in mind that each letter made up of two or more symbols must be made compact as if each one were set out by itself. Practice this exercise until it is thoroughly mastered.

F G K J Q W X 1 2 3 7 9

Instructors' check here:—

EXERCISE 8.

37. As the period, comma and interrogation mark are used more often than all others, it is important that this exercise be given careful attention, as the indication of punctuations in messages, train orders, etc., is so frequent, that it is absolutely necessary for an operator to know these. Practice the following in various combinations, until each one is thoroughly mastered. It is advisable to drill on each one several times before making the other, then go through the whole exercise in the order that they appear.

The uses of the punctuation code will be taken up in another lesson, and various examples will be illustrated, to give the student the correct idea of how and when they are used. Period. Comma. Interrogation. (SX). Cents (C).

Quotation at beginn'g (QN) Quotation at end (QJ) Dash (DX)

Instructors check here:—

EXERCISE 9.

A B C D E F G H I J K L M N O P Q R S
T U V W X Y Z &

Instructors' check here:—

EXERCISE 10.

1 2 3 4 5 6 7 8 9 0

Instructors' check here:—

EXERCISE 11.

38. In this exercise we will combine letters from the preceding exercises, with a view of having the two or three letters made, using the same spacing as if they belonged to a word, and also using the same space between each exercise as if it were the space between words in a sentence:—

Si	Hi	Sc	Re	He	Hi	His	Has	Sat
Pa	No	Ro	Na	Gu	Wh	Je	Ju	Wr
Ru	Ri	Ak	Di	Dn	Mu	Mi	Ry	Vi

Instructors' check here:—

EXERCISE 12.

NUMBERS AND DECIMALS.

39. In writing large numbers, a short space is usually made between every three figures. The decimal point is transmitted by spelling out the word "dot." Practice on this exercise in regular order, until you can make them with ease. Do not make the period which is shown at the end of each set of figures, nor do not make the comma, as it is only shown here to separate the three figures where the short pause is to be made. In writing a number of figures following one another (such as car numbers), it is customary to put a comma between each set.

1,000.	1,506.	1,500.	2,320.	3,123.
14,135.	123,708.	978,467.	875,900.	1,315,479.
4.5.	5.11.	6.25.	10.1.	
215.01.	\$1.25.	17.0005.	\$184.25.	

Instructors' check here:—

EXERCISE 13.

FRACTIONS.

40. In fractions, a dot (that is the letter E) represents the dividing line. It is also used when a hyphen is shown between figures, which is the same as the fraction sign. In making the E, it is customary to make it quickly and immediately follow it with a figure.

$\frac{1}{3}$	$\frac{2}{3}$	$\frac{3}{4}$	$\frac{7}{8}$
$\frac{9}{10}$	$\frac{15}{16}$	$\frac{13}{14}$	$\frac{6}{7}$

Instructors' check here:—

EXERCISE 14.

RESULTS OF IMPROPERLY MADE CHARACTERS.

41. In the following lines, the first two characters, improperly connected by too short an interval, will make the third character. Thus, if a and t are connected by too short an interval, w will be made; and if e and d are made with too short an interval between them, an x will be made, and so on.

a	t	w	e	d	x
u	e	q	v	e	3
u	i	2	u	d	(Period)

42. Repeat the above exercise, being careful to form each character correctly, as this will lead to a perfect style in sending. There are almost as many styles of sending among operators as there are styles of penmanship.

Instructors' check here:—

EXERCISE 15.

WORDS.

43. The following exercise contains simple words, without spaced letters, and also words containing spaced letters, and it will be noticed that in words where no spaced characters are shown, they are much easier to write. The words (and, the, is, at, etc.) will be recognized more quickly than any others, as they do not tax the memory or the mind to remember what they really are. Practice this exercise until each word can be made without a mistake.

And	Warrant	Practice
Is	Ice	Judgment
Nominate	Was	Little
Vacant	Limited	Poison
Icicle	Let	It
The	Quotation	Opinion
Terminate	Rice	Desire
Maintain	Were	Train
Mississippi		

44. Be careful to make An, H, J, K, P, S, and Th correctly in order to avoid their being taken for other characters as previously indicated.

Instructors' check here:—

EXERCISE 16.

45. In practicing the following sentences, the student will have acquired all the various combinations of letters, figures, etc., and the balance of the instruction, so far as the practice work is concerned, should be devoted to various exercises that you feel you need the most practice in. Coupled with these, you should practice (when the times comes for you to receive instruction in messages, train orders, etc.) the proper way of sending railroad and commercial messages, train orders, train reports, etc., keeping in mind that all through the course, **practice is the secret of success in learning telegraphy.**

SENTENCES.

How are you?

How is the weather there?

Have you any freight for me?

Do you want to stop 54?

I am busy.

The shipment was delayed.

Ask him to speak.

Is that so?

Your way bill is incorrect.

When will shipment go forward?

The train was delayed.

Original copy was attached.

The train was late.

Instructors' check here:—

ACCURATE SENDING.

46. Sending accurately is more important than high speed, for it is only by accurate sending that a student may hope to form a proper habit, and the constant application of the proper habit will increase the speed gradually. When writing on the key, it is necessary to have the various characters thoroughly fixed in your mind; when you desire to make a character, the mind instantly recalls what represents it, and no hesitation is necessary. The student should cultivate a firm, even, smooth style of sending, and strive for accuracy rather than speed.

47. The custom of timing to ascertain the speed of sending should be very sparingly indulged in by the beginner, for it is likely to produce careless habits. The speed of sending should be graduated to suit the capacity of the receiver. The letters should never be crowded.

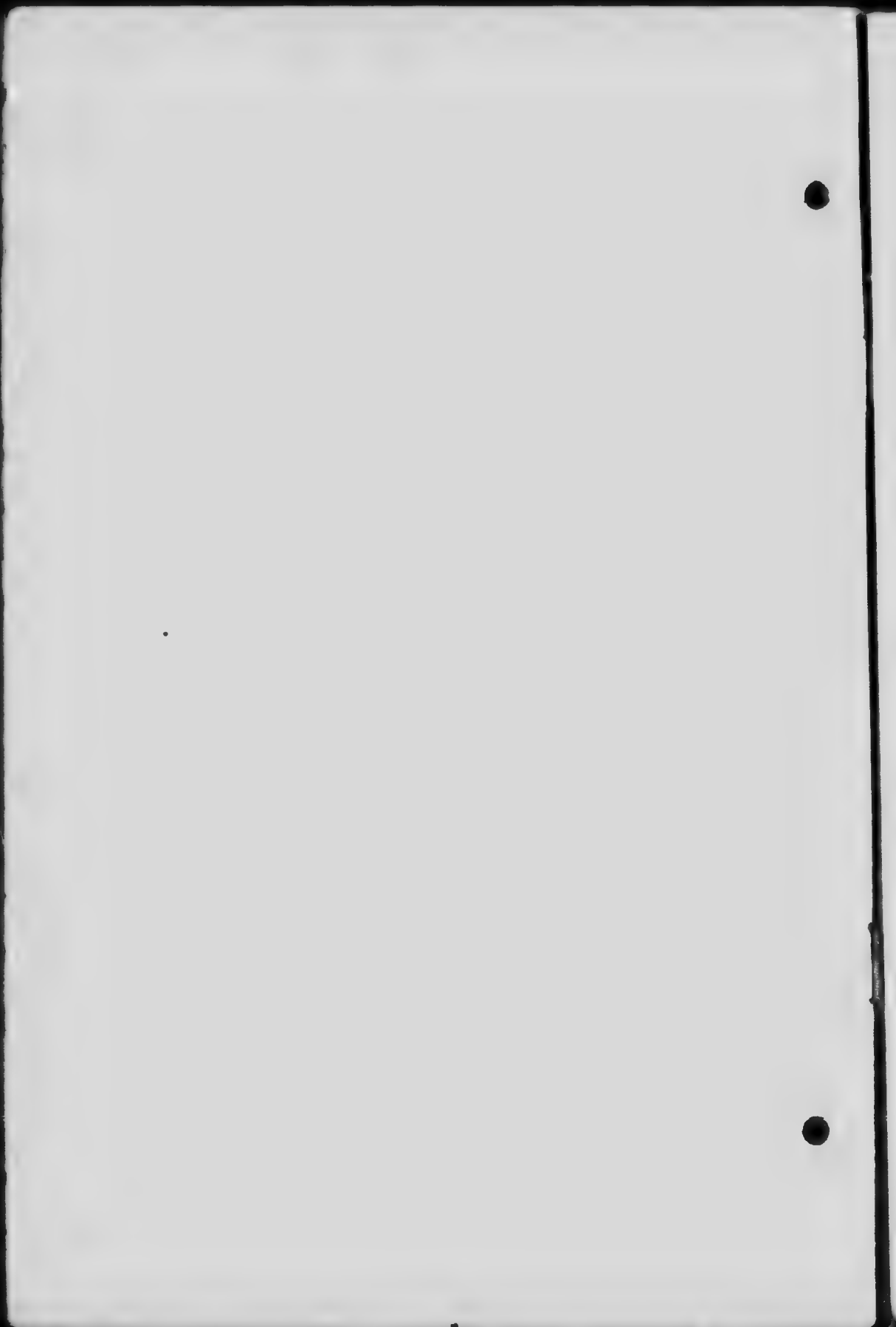
48. An operator is no judge of his own sending, and therefore should not try to see how fast he can send, until he has had considerable experience, yet if you know you have formed the proper habit, and that the character is made properly, it is desirable that you endeavor to gradually increase the speed in writing. While fast sending is seldom indulged in by strictly first-class operators, yet fast time is made by them on account of their steady, even gait, their perfect characters and few repetitions or mistakes.

49. When you are writing for some one to copy down what is being sent, and the receiver tells you you are not writing properly, or not spacing evenly, accept the suggestion, and endeavor to improve by it, realizing that it is for your own future benefit. A great many mistakes are made unconsciously.

50. Before taking up the next lesson, which is on receiving, a student should carefully review all the exercises in this book, and feel satisfied with himself that he can make them without error. After this thorough review, write out the answers to the Test Questions that appear at the back of the book, and hand them in or send them to us for criticism.

TEST QUESTIONS.

1. Describe the method of holding the key.
 2. What direction should the arm move in when writing on the key?
 3. (a) Have you gone through the exercises given in the lesson?
(b) Do you feel satisfied that you can make them on the key perfectly?
 4. What is most important in sending?
 5. Give a list of the characters that are the reverse to each other.
 6. Is it proper to time yourself for speed?
 7. Make a report in your own words of the progress you feel you have made, advising any particular part of the lesson that appears difficult to you.
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TELEGRAPHY

Special Examination No. 2

1. (a) When a train order has been repeated or "X" response sent, and before "complete" has been given, how will the order be treated? 214.
(b) If the line fail before an office has repeated an order or has sent the "X" response, how will the order be treated?
2. Which copy must the Operator who receives and delivers a train order, preserve? 215.
3. When a train is named in a train order and by its schedule number alone, are all sections of that schedule included? 218.
4. When must an Operator not repeat or give the "X" response to a train order for a train which has been cleared, or of which the engine has passed his train order signal? 219.
5. (a) How long do train orders once in effect, continue so? 220.
(b) May any part of an order be preceded or annulled?
(c) When do orders held by or issued for or any part of an order relating to a regular train, become void?
6. (a) What kind of a signal must be used at each train order office?
(b) What is its normal indication?
(c) Under what conditions will the normal indication be changed?
(d) When an operator receives the signal "31" or "19," followed by the direction, what is he required to do?
(e) Under what conditions may the signal be restored to normal indication?
(f) When may a train proceed after being stopped by a train order signal?
(g) What is required of Operators if the fixed signal should fail to work properly?
(h) If a signal is not displayed at a night office, what is required of a train that has not been notified?
7. What is required of Operators with regard to reporting the arrival and departure of all trains? 222.
8. In the following order, how will trains run with respect to each other?

"No. 1 Eng. 262 meet No. 2 Eng. 275 at D."

DOMINION SCHOOL OF TELEGRAPHY AND RAILROADING

TELEGRAPHY, SPECIAL EXAMINATION NO. 2—Continued

9. Should a meeting order be sent for delivery to a train at the meeting point, what addition is made to the order?
10. "Extra 37 West has right over No. 3 Eng. 453 B to D."
Under this order, when may a regular train go beyond the point last named?
11. "No. 1 Eng. 942 run twenty (20) minutes late A to E."
"No. 1 Eng. 942 run twenty (20) minutes late A to E and fifteen (15) minutes late A to T."
How do the above orders affect the schedule time of the train named between the stations mentioned?
12. (a) "No. Eng. 56 wait at H until ten (10) a.m. for No. 10 Eng. 75."
In this order when may the first named train pass the designated station?
(b) How will the last named train be governed?
13. (a) "No. 1 Eng. 65 and No. 3 Eng. 73 wait at N until ten (10) a.m.—P. until ten-thirty (10.30) a.m.—R. until ten fifty-five (10.55) a.m."
Under this order may the train named pass the designated station before the time given?
(b) How will other trains receiving orders be governed?
14. When extra trains are run over working limits, what must they be given?
15. (a) "Eng. 292 work seven (7) a.m. to six (6) p.m. between O and E, not protecting against east bound extras."
Under this order, how will the work extra be governed?
(b) If the wording in the above order were changed to read, not protecting against extras, how would the work extra be governed?
16. How will a train holding an order to meet a work extra be governed?

SUPPLIES FOR STUDENTS.

We always keep on hand the necessary supplies, so that students need not go outside the school to get anything they require in connection with their studies.

A student beginning his course in the Day School pays \$2.00 for his instruction books and a supply of stationery. The stationery consists of scribbling books, writing pads, speed examination pad, two pencils, pen holder, two pen points, in addition to having the regular station forms which are supplied in the stations. The message blanks, etc., are not required until such time as a student gets in the senior class.

The following articles may be purchased any time through the school:—

Telegraph Learner's Outfit, including dry cell battery and wire	\$3.00
Individual Telegraph Key (Leg), each.....	1.75
Individual Telegraph Key (Legless), each.....	2.25
Individual Telegraph Sounder, each	2.75
Bell Wire for connecting instruments, 25 feet for.....	.15
Blue Vitrol (for Gravity Battery), per lb.....	.15
Jar for Gravity Battery	.40
Gravity Battery, complete, with copper, zinc and Blue Vitrol, 1 lb.....	1.25
Dry Cell Battery, each	.25
Fountain Pens, Special	1.50
Stylusses for writing train orders, each	.25
Scribbling Pads, each	.05
Examination Pads (3 for 25s) each	.10
Pen Holders, each	.05
Pencils, 2 for	.05
Twentieth Century Telegraph Manual, by Frederick L. Meyer, Chicago	1.50
Penmanship Book, Part 1	.15
Penmanship Book, Part 2	.25
Mecograph (A Hand Sending Instrument)	9.00
Automatic Telegraph Transmitter (for home study purposes)	25.00

